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WHITEPAPER:

TURNING VEHICLE MOUNTED COMPUTERS INTO A COMPETITIVE ADVANTAGE

Stronger Uptime, Fewer Errors, and Faster ROI in Modern Supply Chains

Winmate – Your Best-Mate in Rugged Solutions

Keeping Supply Chains in Motion

Modern supply chains run on moving assets. Forklifts, yard trucks, order pickers, AGVs, and even vans and trucks are the service equipment that turn warehouse plans into real work, from receiving to shipping. When these assets are delayed or stopped, the impact ripples across operations: routes take longer to complete, energy consumption rises, schedules fall behind, and overall productivity drops. Even small adjustments in warehouse layout, routing strategies, or dock-door assignments can affect how far vehicles travel and how safely people and goods move.

In these high-pressure environments, operators need more than just equipment. They need clear instructions, fast and accurate data input, and reliable connectivity under all conditions, from vibration and temperature changes to working with gloves. That's exactly where a **Vehicle Mounted Computer** makes the difference.

What is Vehicle Mounted Computer?

A Vehicle Mounted Computer (VMC) is essentially a rugged workstation built directly into a vehicle, whether it's a forklift, yard truck, order picker, AGV, or service truck. Instead of relying on handheld devices, operators have a durable, always-on computer mounted in front of them, designed to withstand constant vibration, extreme temperatures, and the demanding conditions of warehouses, ports, and industrial sites.

How Vehicle Mounted Computers Create Value?

Sarah

Warehouse Operations Manager

- Manages a smart, omni-channel DC, from receiving to shipping.
- Accountable for pick & ship SLAs and smooth daily flow.
- Leads floor teams & 22 vehicles, plus AMRs during peaks.
- Faces biggest pressure in Q4 surges, promos, and carrier cutoffs.
- Knows every delay ripples across operations.

Goals

- Keep on-time shipments **above 98%** and dock-to-stock **within 4 hours.**
- Increase throughput by **10–15% lines/hour** without adding staff or overtime.
- Maintain pick accuracy **≥99.7%.**
- Reduce wasted forklift travel (deadheading) and energy use per pallet.
- Ensure safer aisles with fewer traffic conflicts or near misses.

Challenges

- Forklifts spend too much time traveling empty due to fragmented replenishment triggers.
- Pallets are often unloaded far from their storage aisles, creating long put-away trips.
- Devices slow down work: screens are hard to read in bright light, gloves interfere, Wi-Fi drops force restarts.
- Congested aisles and unclear task priorities lead to bottlenecks and safety risks.

What Helps

- **Vehicle Mounted Computer (VMC):** compact, glove-friendly, sunlight-readable screen, fast login/resume, scan-to-confirm, offline queueing, rugged and reliable in vibration or temperature swings.
- **Smarter processes like the broom effect:** hourly aisle sweeps to complete all replenishments in one go, right-door receiving so pallets arrive near their storage aisles, clear traffic rules and task priorities to reduce conflicts.

Proof of Value

- **Less Travel, More Efficiency**: Reduce travel 11–13% using the broom effect, and up to 35% when combined with smarter inbound scheduling.
- **More Time Gained:** Each forklift can save 30–75 minutes per shift, freeing operators for more picks and replenishments.
- **Proven Rollout Method:** Start with one pilot aisle, track weekly results, then expand across the site for maximum impact.

Industry Applications

Warehouse & Distribution

Ports & Container Terminals

Smart Agriculture

Mining & Construction

Airports & Ground Support Equipment

Public Safety & Government

Case Study

- **Background**

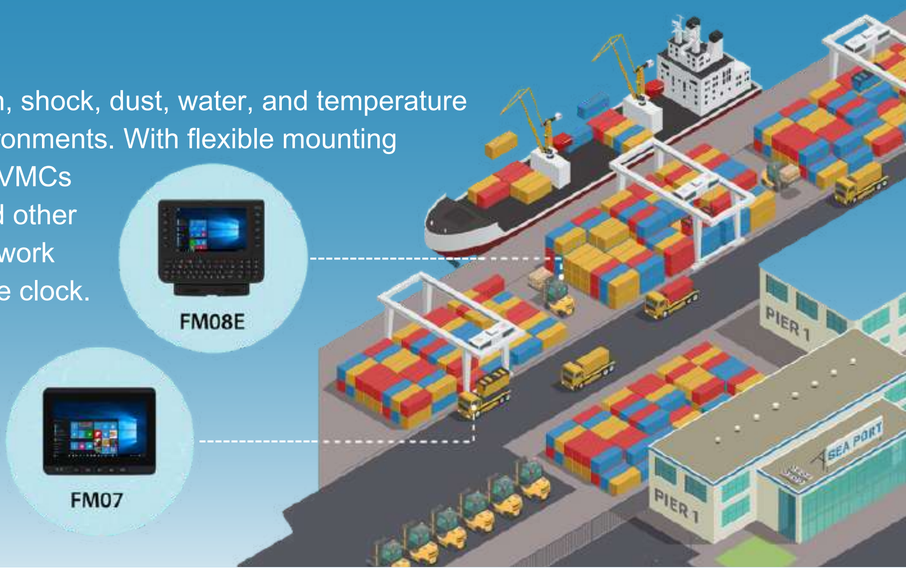
Logistics ports rely heavily on forklifts and material handling vehicles to move, track, and manage cargo efficiently across large, dynamic yard environments. Operators require durable, in-vehicle computing systems that provide access to real-time data, support communication with the warehouse management system (WMS), and withstand the physical demands of 24/7 port operations.

- **Solutions**

To meet the demanding requirements of modern port and warehouse operations, Winmate's Vehicle Mounted Computer product family offers a range of rugged solutions designed for different vehicle types and workflows. Across the lineup, these devices feature sunlight-readable touchscreens with glove and rain support, optional physical keypads for faster data entry, and wireless connectivity that keeps vehicles linked to central systems in real time.

- **Why Winmate**

Each model is built to withstand constant vibration, shock, dust, water, and temperature extremes, ensuring reliability in the toughest environments. With flexible mounting options and wide power compatibility, Winmate's VMCs integrate seamlessly into forklifts, yard trucks, and other material-handling vehicles, enabling operators to work faster, safer, and with greater accuracy around the clock.



Winmate Vehicle Mounted Computer Product Family

FM SERIES

Windows

8"

FM08E

Intel Elkhart Lake
x6413E / x6425E

FM08E-Gen 2

Intel Amston Lake
x7433RE / x7835RE

10.4"

FM10E

Intel Elkhart Lake
x6413E / x6425E

FM10E-Gen 2

Intel Amston Lake
x7433RE / x7835RE

12.1"

FM12E

Intel Elkhart Lake
x6413E / x6425E

FM12E-Gen 2

Intel Amston Lake
x7433RE / x7835RE

Android

10.4"

FM10Q

Qualcomm Snapdragon 660

FM10MG

MediaTek Genio 510

12.1"

FM12Q

Qualcomm Snapdragon 660

FM12MG

MediaTek Genio 510

DID YOU KNOW?

In many warehouses, forklifts spend over ***two-thirds*** of their travel time driving empty. The ***broom effect*** changes that by having forklifts “sweep” an aisle in one pass, completing all replenishments before moving on.

When combined with a Vehicle Mounted Computer (VMC) that guides operators with on-screen task lists and scan-to-confirm steps, this approach can **cut travel distance** by **10–35%**, reduce stockouts, and free up nearly ***an hour of productive time*** per forklift, per shift.

Winmate Vehicle Mounted Computer Product Family

FM-V SERIES

Windows


7"

FM07 / FM07P
Intel Apollo Lake N3350

FM07E
Intel Elkhart Lake x6413E


8"

FM08E-V/Gen2
Intel Elkhart Lake x6413E / x6425E
Intel Amston Lake x7433RE / x7835RE


10.4"

FM10E-V/Gen2
Intel Elkhart Lake x6413E / x6425E
Intel Amston Lake x7433RE / x7835RE

FM10AD-V
Intel Alder Lake Core i5-1235U


12.1"

FM12E-V/Gen2
Intel Elkhart Lake x6413E / x6425E
Intel Amston Lake x7433RE / x7835RE

FM12AD-V
Intel Alder Lake Core i5-1235U


14"

FM14E-V/Gen2
Intel Elkhart Lake x6413E / x6425E
Intel Amston Lake x7433RE / x7835RE

FM14AD-V
Intel Alder Lake Core i5-1235U

Android


7"

FM07M
MediaTek Genio 350

FM07MG
MediaTek Genio 510


8"

FM08MG-V
MediaTek Genio 510


10.4"

FM10Q-V
Qualcomm Snapdragon 660

FM10MG-V
MediaTek Genio 510


12.1"

FM12Q-V
Qualcomm Snapdragon 660

FM12MG-V
MediaTek Genio 510


14"

FM14Q-V
Qualcomm Snapdragon 660

FM14MG-V
MediaTek Genio 510

TRENDS TO WATCH IN VEHICLE-MOUNTED COMPUTER

- **Internet of Vehicles (IoV):**

Vehicles are becoming connected data hubs, linking with WMS, TMS, ERP, and cloud systems in real time. VMCs act as the operator's interface to this network.

- **Edge Computing at the Vehicle:**

More processing power is moving onto the vehicle itself, enabling faster decisions for routing, safety prompts, and workflow optimization without relying solely on the cloud.

- **4G/5G & Private Wireless Networks:**

Next-gen wireless provides low-latency, high-bandwidth connections across large yards, ports, and campuses, making seamless roaming and real-time updates possible.

- **Automation & Human-Machine Collaboration:**

Forklifts, AGVs, and AMRs increasingly share the same workspace. VMCs serve as the coordination point between human operators and autonomous systems.

- **Sustainability & Energy Efficiency:**

Reducing wasted travel and rework lowers energy use and emissions. Rugged VMCs also extend device life, reducing e-waste and lowering TCO for fleets.

Up to

35%

Reduction in forklift travel distance through optimized routing and "broom effect" sweeps.

Over

99%

Order and inventory accuracy achieved with VMC + barcode/RFID scanning

Less than

12 months

Typical ROI period for VMC deployments.

Who Needs A Vehicle Mounted Computer?

Take this quick Yes/No quiz:

1. Do your forklift drivers spend time walking back to fixed terminals or waiting for paper instructions?
2. Are more than 2–3% of your picks or shipments incorrect due to manual errors?
3. Do your operators lose time in aisles due to Wi-Fi dead spots or device failures?
4. Does your team struggle to keep up with seasonal peaks without adding temporary labor?
5. Do you need to improve inventory accuracy, travel efficiency, or safety in your yard or warehouse?

If you answered "Yes" to 3 or more questions, your operation is ready for the productivity and accuracy gains a Vehicle Mounted Computer can deliver.

Winmate Readiness

Winmate's Vehicle Mounted Computer family is built for the real challenges of ports, yards, and smart warehouses:

- **Sized for every task:** from 7" to 14", matching small cabins to data-intensive workflows.
- **Rugged for 24/7 work:** Compliance with MIL-STD and IP65 standards ensures resistance to shock, vibration, dust, moisture, and extreme temperatures.
- **Always connected:** Wi-Fi, BT, LTE options keep operators in sync with WMS/YMS/ERP.
- **Easy to integrate:** Flexible mounting and wide-range power input fit seamlessly into forklifts, trucks, and yard vehicles.
- **Operator-first design:** Glove-friendly, sunlight-readable touchscreens and optional keypads make interaction quick and reliable.

About Us

With over 30 years of industry experience, Winmate is a global leader in rugged computing and intelligent edge solutions. From rugged tablets and rugged laptops to panel PCs, industrial displays, Edge AI systems, and robotic controllers, our products are built to support demanding environments across industries. We specialize in providing tailored solutions and hardware customizations to meet the unique needs of customers in sectors such as industrial automation, defense, logistics, automotive, and more. Backed by in-house testing laboratories and a strong global distribution network, Winmate ensures reliable performance, long-term support, and proven durability.

For more information about Winmate, please visit our website: www.winmate.com

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