Success Story

Mouser

Scaling throughput with the world's largest VLM System

MOUSER ELECTRONICS

kardex

Case at a glance

World's largest VLM installation takes electronics distribution to new heights
Mouser Electronics is a global leader in the distribution of semiconductors and electronic components, dedicated to serving the unique needs of the electronics manufacturing and design community. Headquartered in Mansfield, Texas, with its new expansion, Mouser operates from a state-of-the-art, 1.6 million-square-foot global distribution center (DC) that serves as the hub for their operations.
From this two-building DC complex, Mouser efficiently fulfills orders for more than 650,000 customers across 223 countries and territories.

With 187 Kardex Shuttles in operation, Mouser Electronics is the largest user of Vertical Lift Modules in the world - enabling them to process orders faster, maximize capacity, and achieve near perfect picking accuracy.

Empowering engineers worldwide

Customer and task
With an expansive catalog of 1.2 million SKUs sourced from 1,200 suppliers, Mouser delivers an unmatched variety of components to engineers, manufacturers, and hobbyists alike.

Whether it's assisting with rapid prototyping or supporting larger-scale supply chain needs, Mouser's focus remains the same: delivering fast, accurate, and reliable service to a global customer base.

Solution
As Mouser Electronics continued to experience rapid growth, their manual order-pulling process began to show its limitations. To address their growing operational challenges, Mouser Electronics, supported by PWD, implemented Kardex Shuttle Vertical Lift Modules (VLMs) for higher throughput, increased storage capacity, and better picking quality.

After seeing the immediate impact, Mouser scaled quickly - growing to 44 Kardex Shuttles within nine months. Over the next four years, Mouser continued to scale its use of VLMs to keep pace with customer demand. Today, with 187 Kardex Shuttles in operation, Mouser Electronics holds the distinction of being the largest user of Vertical Lift Modules in the world – a testament to their commitment to innovation and efficiency.

Faster
order picking

Optimized
space

Better
picking
accuracy

When manual work comes to its limits

As Mouser Electronics continued to experience rapid growth, their manual order-pulling process began to show its limitations. With SKU inventory growing and order volumes reaching 70,000 lines per day, reliance on traditional picking methods was becoming increasingly unsustainable. "We used to pull by order," explains Matt Bell, Vice President of Outbound Operations. "Order pullers had carts, and walked up and down aisles of shelving where parts were stored. But with the increase in volume, pulling by order just didn't make sense anymore."

The challenges went beyond order volume. Mouser's commitment to giving customers exactly what they need – even if it's one single resistor – meant that order pullers were not only navigating warehouse aisles but also frequently traveling to packaging stations located elsewhere in the facility. This excessive walking added unnecessary time to the fulfillment process. "It was a ton of time spent walking, and we were running out of space to put SKUs," says Bell. "When you're growing like we were, the inefficiencies really start to add up."

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Matt Bell, Vice President of Outbound Operations at Mouser

These operational hurdles became a catalyst for change, prompting Mouser Electronics to leverage their longstanding partnership with automation integrator Precision Warehouse Design (PWD), to help design and implement a solution to streamline their processes, reduce walking time, and keep pace with growing demand without sacrificing order accuracy and service.

Transforming order fulfillment

To address their growing operational challenges, Mouser Electronics, supported by PWD, implemented Kardex Shuttle Vertical Lift Modules (VLMs) for higher throughput, increased storage capacity, and better picking quality. "We needed a solution fast," recalls Bell, "From the day we ordered the first Kardex Shuttles to the day they were installed was just 12 weeks."

After seeing the immediate impact, Mouser scaled quickly – growing to 44 Kardex Shuttles within nine months. The results have been transformative. With the Kardex Shuttles, Mouser Electronics processes orders faster, optimizes existing space, and boasts better picking accuracy.

This success laid the foundation for Mouser's continued automation journey. Over the next four years, Mouser continued to scale its use of VLMs to keep pace with customer demand. Today, with 187 Kardex Shuttles in operation, Mouser Electronics holds the distinction of being the largest user of Vertical Lift Modules in the world – a testament to their commitment to innovation and efficiency.

- 187 Vertical Lift Module Kardex Shuttles
- Kardex JMIF Software
- Pick-to-light TIC Display

Boosting throughput and worker productivity

Operating on a goods-to-person principle, the Kardex Shuttles have significantly increased picking throughput and worker productivity. "The Kardex Shuttles bring the goods directly to the order puller, and the order puller has everything they need right at their workstation—labels, bagging supplies, and other tools," explains Bell. "This drastically decreases pick duration and travel time, so employees can spend more time pulling orders and less time walking."

The Kardex Shuttles also offer operational flexibility, allowing Mouser to scale labor with demand. During peak periods, Mouser assigns one worker per VLM to maximize throughput. When demand is lower, a single operator can manage multiple VLMs, freeing up labor for other tasks in the warehouse. This adaptability ensures that Mouser can maintain efficiency regardless of fluctuations in order volume.

This efficiency has enabled Mouser to scale its operations without a proportional increase in labor. "Even during years when we've grown by 20%, we haven't needed to increase staffing by nearly that much," says Bell. By leveraging automation to increase productivity and throughput, Mouser has been able to support growth without sacrificing customer satisfaction.

Expanding capacity without expanding footprint

With space at a premium and more SKUs arriving every day Mouser needed more capacity – and fast. PWD helped Mouser identify an underutilized area where Vertical Lift Modules could maximize cubic storage by leveraging vertical space. This approach allowed Mouser to expand their capacity without requiring additional square footage or major construction.

"The constraints of the facility meant we needed to get more dense vertically," explains Marc DeWall, VP of Operations at PWD. "There was simply no more room for more shelving or mezzanines. VLMs were the ideal solution - not only did they offer fast lead times and higher storage density, they provided added benefits like increased throughput and better picking accuracy."

Enhancing accuracy while simplifying work

Maintaining exceptional order accuracy and on-time shipping is critical for Mouser Electronics, especially as order volumes increase. With the Kardex Shuttles, Mouser has been able to consistently meet their service level goals, achieving a 99.9% on-time shipping rate for next-day orders. "When we started the automation journey, it was becoming challenging to maintain those metrics during periods of growth," says Bell. "The Kardex Shuttles have helped us maintain our level of customer service – we're shipping stuff on time."

In addition to delivering the SKUs directly to the operator, the Kardex Shuttles are equipped with built TIC (transaction information centers). This pick-to-light solution directs order pullers to the exact location to pick from and displays the quantity to pick. "The process is still the same, but it's far more efficient and easier for the worker," Bell explains. "There's very little chance of making an error because the system is designed to be intuitive and accurate." By improving both worker conditions and picking quality, the Kardex Shuttles ensure Mouser delivers the precision their customers rely on.

Inside Mouser's fulfillment process

Mouser transitioned from a manual picking and replenishment process to a highly automated system leveraging ASRS, AutoStore, OPEX, and eight miles of conveyor to increase efficiency.

With over 1.2 million SKUs ranging from fast-moving items to slow movers of various shapes and sizes, Mouser leverages a mix of automation systems to optimize every aspect of their operation—from receiving and order pulling to consolidation and shipping.

Mouser Electronics receives 8,000 to 10,000 items daily. Each SKU is unpacked, identified, and routed to its optimal storage location. As SKUs range from components the size of a grain of sand to heavy spools of wire, each type of automation is tailored to handle a specific SKU category. The Kardex Shuttles are used for medium-sized, faster moving SKUs, such as reels; while an AutoStore cube storage solution handles medium-sized SKUs stored in boxes. 'Super pods' house the fastest-moving SKUs with straightforward shelving, and slower-moving SKUs are kept in conventional racking. By carefully sorting SKUs into the appropriate storage medium, Mouser optimizes storage density, retrieval speeds, and handling efficiency.

When a customer order drops into the system, the warehouse management system (WMS) breaks the order into individual lines and assigns them to the appropriate picking zones. As desired, the WMS releases a wave of orders to be picked simultaneously to all warehouse zones. The WMS, integrated with Kardex JMIF software, communicates directly with the 187 VLMs, instructing them to deliver the required lines for the current wave of orders. As the Kardex Shuttle presents the tray containing the required SKU, the operator is directed by the TIC (transaction information center) pick-to-light display to the precise location and quantity to pick. The operator confirms the pick, bags and tags the item, and places it on a takeaway conveyor. Simultaneously, the Kardex Shuttle moves to retrieve the next SKU, minimizing operator wait time and ensuring continuous picking.

Once the individual lines are picked from the warehouse zones, they are sent via conveyor to one of several consolidation areas. Over eight miles of conveyor connect the picking zones to presort and consolidation stations. In the consolidation step, all the line items for an order are combined before moving on to shipping. This process enables Mouser to handle high volumes of complex orders with precision and speed.

Incremental approach to automation success

Mouser's automation journey has been incremental, adding automation one step at a time to meet evolving demands. Each piece of technology plays a specific role in the integrated whole, allowing Mouser to scale and adapt as their business grows. "When you experience the level of growth we've had over the last several years, the efficiency of the automation we add into the mix is consumed relatively quickly. That's why we continue to scale our automation year after year, always looking at ways to improve on customer service excellence, order accuracy, and on-time delivery," explains Bell.

"We continue to scale our automation, always looking at ways to improve on customer service excellence,[...]"

Matt Bell, Vice President of Outbound Operations at Mouser

Mouser's philosophy centers on their customers: their automation strategy is designed to support and service customer needs, not dictate them. Bell adds, "Our warehouse operations don't dictate our growth – our customers do. Mouser gives the customer what they want, even if it means a little bit more handling and work on our end."

Now, Mouser is taking its automation philosophy to the next level as it enters the go-live phase of its new 413,000-square-foot, multi-story Building 2, connected to its existing distribution center by a skybridge with conveyor lines. This expansion incorporates additional technologies to further streamline operations and support customer needs, including Pallet ASRS buffer storage at receiving, two EuroSort systems for improved receiving workflows, and a triple-mezzanine structure from Steel King to support operations. As Building 2 finishes the startup phase with integration support from PWD, the facility will house 300 additional Kardex Shuttle VLMs (77 of which are already installed), an AutoStore system for medium-moving boxed SKUs, and an advanced EuroSort sortation loop for order consolidation. With Building 2, Mouser continues to push the boundaries of automation to ensure they can efficiently and accurately serve their growing global customer base.

Pushing the boundaries of exceptional customer service

Mouser Electronics truly embodies the notion of putting customers' needs first. Nowhere is this more evident than in their continued investment in automation. From installing the very first VLMs over 7 years ago, to cutting the ribbon on their brand-new building filled to the brim with cutting edge automation technology, Mouser has demonstrated a steadfast commitment to improving their customer service with automation.

This customer-centric growth strategy shows the how powerful automation can be when it's laser-focused on improving available inventory, lead times, and order accuracy for customers.