

IBM

Retrotech, Inc. provided state-of-the-art, non-proprietary designs to upgrade IBM's distribution center to increase reliability, flexibility, and productivity.



IBM Distribution Center Mechanicsburg, PA

About IBM:

IBM's Mechanicsburg Distribution Center serves as an international distribution source for computer parts. The site was constructed in 1981 and contains 21 aisles of Eaton-Kenway mini-load storage and 7 aisles of unit-load storage. The 21-aisle mini-load storage area has approximately 29,400 locations. Bins, which can weigh up to 500 pounds each, are used to store the incoming computer parts. Mini-load stackers operate to store and retrieve the bins. Two levels of P&D stations at the end of the aisles serve as the pick up and deposit points for the bins: Level 1 is used for replenishment; Level 2, for pick. Operators use PCs, located at the end of the aisles, to direct stacker operation. The PCs are linked to IBM's host computer for order fulfillment and inventory control.

Incoming product is moved through a dedicated sortation area by means of a conveyor to designated P&D stations on Level 1 for stacker pick up and storage. When product is required for picking, a stacker removes a designated bin from storage and brings it to its respective Level 2 P&D station where the bin is moved by a conveyor to the Mezzanine level for picking. Operators select the required parts and place them into bins on a dedicated sortation area conveyor to be moved to shipping.

Business Challenges:

- ▶ Efficiency and reliability of the Eaton-Kenway mini-load operation had deteriorated due to equipment obsolescence. The stackers horizontal and vertical positioning systems, horizontal DC drives and motors were outdated.
- ▶ Reliability and performance of its mini-load operation needed to be modernized and improved.
- ▶ OEM support for the proprietary KE-8 controllers was limited.
- ▶ Upgrade quickly and remain fully operational.

Highlights of the Project:

The Eaton-Kenway Stackers were upgraded with new retractors and on-board controls to significantly improve communications and positioning.

Retrotech custom designed and constructed 21 new retractors, specifically for IBM's application, with motors and drives to control the speed of the pin mechanism. Each retractor has two distinct subsystems—lateral shift and chain/pins—that work together to move the bins into and out of the rack locations. The lateral shift subsystem now uses a motor and rotary cam switch assembly together to determine the position of the retractor as it moves to the right or left side of the stacker to pick up or store the bins. The chain/pins subsystem uses a motor, two chains, and a combination of proximity and photosensors to position, pick up, and return the bins to their storage locations.

Allen-Bradley's (A-B) SLC-500 system was selected to interface between on-board controllers and off-board control components. Retrotech replaced existing controls with a combination of PLC logic, Spectra Precision ICS 5000s, and SEW VF inverter controls for horizontal positioning and provided new motor starters for vertical positioning.

Forty-two Spectra Precision® ICS 5000 infrared positioning units are used in conjunction with the A-B SLC 500 modules to position the mini-load both horizontally and vertically to within 1mm accuracy.

Communication controls were replaced with SICK ISD 230 infrared communications modem pairs. The SICK modems transmit data between the on-board and off-board SLCs. One unit is attached to the stacker and the other is mounted at the end of the aisle.

To allow picking during the retrofit aisle shut downs, Retrotech designed and built an Emergency Parts Picker that was moved from aisle to aisle as needed to assure continuous availability of needed repair parts.

Results:

- ▶ By performing the upgrade "live," customer inconvenience and downtime was kept to a minimum.
- ▶ The new retractor mechanical design provides significant reliability by eliminating the undependable planetary gear-type transmissions of the original system.
- ▶ The new logic, horizontal and vertical positioning and drive systems optimize stacker movement, significantly increasing productivity.
- ▶ Simple, on-board PLC controls allow personnel easy maintenance and troubleshooting.
- ▶ IBM now has the flexibility to meet changing customer demands and accommodate future business growth — in a cost-effective manner.

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