

Cubic Designs Inc.
CUSTOM MEZZANINE SYSTEMS

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HOW CIRRUS LOGIC MAKES THE MOST OF A MOVE

A work-in-progress system based on carousels drives the operation. Packaging on the mezzanine adds a space-saving benefit. How does one of the fastest growing integrated circuit (IC) manufacturers meet inventory and distribution needs when sales increase at a rate of 50 percent a year and when you're running out of space at your main distribution center?

Cirrus Logic manufactures chips that control computer hard disk drives, display graphics, digital and analog audio, video processing, wireless communication, and other peripheral functions of personal computers and workstations. It supplies chips to leading computer companies like Apple Computer Inc., IBM Corporation, Zenith Electronics Corporation, Dell Computer Corporation, Compaq Inc., and others. The company receives product from several suppliers located throughout the world.

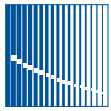
The challenge at Cirrus Logic was not only to keep up with its phenomenal growth, but also to deliver fully tested 100% defect-free integrated circuits on time. Shipping defect-free ICs is a necessity at Cirrus Logic, which knows that in its booming markets, nothing less than 100 percent is acceptable; "zero defects" is its goal.

Cirrus Logic realized that in order to continue growing, it needs to remain on the cutting edge of technology and continue meeting customer delivery demands. In many cases, this means processing same-day orders.

To meet the demands of growing distribution, Cirrus Logic pulled together an automated material management system to replace the manual order picking system the company had been using from the start.

Development of the Cirrus material management system began in January 1992. At that time, J.D. Streeter, senior manager of materials at Cirrus, was told that the company would be moving its distribution center from Milpitas, California, to a new facility in a predesigned building in Fremont.

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"I couldn't see moving a manual operation to the new facility," said Streeter. "I knew I had roughly the same amount of space to work with at the new facility as I did at the old facility, in terms of square footage. We had to move the entire operation and plan for a system that would accommodate an aggressive growth forecast."

After interviewing several contractors, Cirrus chose Warehouse Engineering of San Jose, California for the project.

Warehouse Engineering began with a study of Cirrus Logic's distribution requirements and inventory volumetrics. They analyzed:

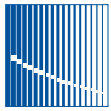
- The number of SKUs in inventory;
- Inbound and outbound shipping activities;
- Delivery frequencies;
- Physical characteristics of each SKU;
- Shelf-life limitations;
- Planned stock levels;
- Existing warehousing software and related hierarchy;
- Staffing and space requirements

Planning and designing the system took a year; installation took less than six months.

How The System Works

Incoming assemblies and wafers are logged into the system at receiving. They are removed from their shipping containers, placed in totes (Molded Fiber Tray Co.) and then temporarily stored as work-in-progress (WIP) in the carousel system (Diamond Phoenix).

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To minimize lifting in receiving, two conveyor lifts were installed on the first floor. A specially designed dolly enables material handlers to move cartons with little effort. Tote boxes are automatically stored in the carousel by robotic inserters/ extractors.

Production test calls out the totes by part number and delivers them to the test floor by conveyor (Interlake). When they assembly or wafers pass test, they are released and returned to the carousel or to and off-carousel location. Once back from the test, the assembly or wafer awaits a trip to the packaging area for order or stock processing.

Cirrus Logic's parts move in and out of the carousels a minimum of four times while they are being processed at the Freemont distribution center. Approximately 4 million integrated circuits are processed through the system monthly.

"There are nine separate PLCs operating simultaneously," said Ernie Ereno, president of Warehouse Engineering. "Six control the carousels and robotic inserters/extractors, another controls the conveyor system. There's one on each lift and a master system controller PLC on top of the mezzanine."

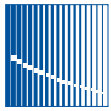
Material Management System

Throughout the entire process, inventory is tracked by lot number, part number, and customer manufacturing code. Everything is bar coded for accuracy.

"The beauty of this system is that we know exactly where a part is at any time," said Streeter. "We know when it arrives, when it's being tested, and when it's ready for packaging."

Perhaps the biggest single challenge was interfacing all the components of the automated system. System control software (Minerva Associates) is the glue that holds everything together.

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Product selected for shipping is conveyed to conveyor lifts that transport the material to a mezzanine (Cubic Designs).

"We're in earthquake country here, so the mezzanine had to be built to meet UBC 91 Seismic Zone 4 code requirements, in addition to the other state codes," Ereno noted. "It had to be safe for the people, and the floor surface had to be conductive. A custom mezzanine was the only solution.

"On top of the mezzanine is the system computer center, 10 packing stations, supervisors' offices, as well as part of the conveyor system. Each packing station is equipped with a computer, bar code scanner and printer, packing supplies, strapper and vacuum sealer.

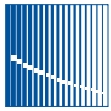
Even the packing workstations were ergonomically designed to simplify handling of totes and shipping materials. All work surfaces are covered with a high-impact plastic that makes it easy for the operator to slide the totes from the conveyor and back again.

"In the old facility, my packing area was approximately 200 feet from the receiving/ shipping area," said Streeter. "Everything had to be trucked by hand from one room to another."

As an operator signs on to process orders, the next order in the queue is assigned to him. The system pulls the correct totes for the order from the carousel and delivers them to the operator's workstation. The totes are scanned (Allen-Bradley) by the operator. The computer monitor at his workstation displays the totes for the order and provides further instructions.

The operator interacts with the instructions and places the totes (remaining parts and packaged orders) on the conveyor. The system delivers the totes to the right place (shipping or back to the carousel).

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Extra Benefits

The new system has enabled Cirrus to consolidate all its warehousing operation under one roof. At one time, the company had warehouses in Foster City, Milpitas and Fremont.

"We were so fragmented before we consolidated here," said Streeter. "We had several different warehouse spaces and we were moving everything out by hand. Now, it's all in a linear flow under one roof, and we operate out of one facility instead of three different locations. We maintain 98.6% uptime, operating 24 hours a day, 7 days a week."

"At the old facility, it took about 22 minutes to locate the part and move it to the pack area," said Streeter. "Now it takes only 3 minutes to get a product to a processing station."

The time saving and efficiency of the automated system enabled Cirrus to keep pace with its growth without adding new employees.

"If we were still operating under the old system, we would have needed to add another 29 people," said Streeter. "At the time that we got the system approved, I had 43 people. Today I have 43 people. And our stock and order processing have increased by 50 percent!"

Based on an article by David Omastiak,
Omastiak & Associates, Inc.