

# Books on Spec

Automating on-demand printing and binding machines

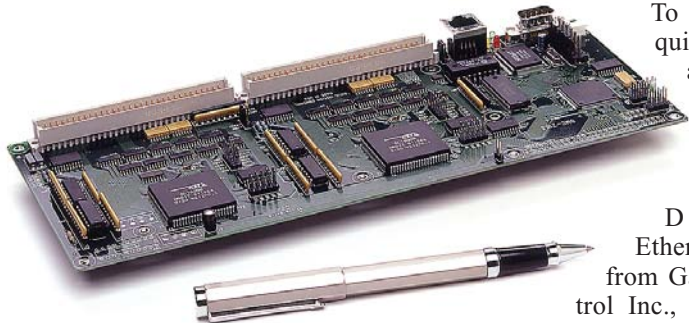
There was a time when the only way a publisher could produce books and make money was to print and sell large quantities. With all the preparation needed to get the presses set up — as well as the rising cost of paper stock — printing smaller quantities of less than 1000 simply did not make economical sense with high volume machines. With the advent of Xerox's DocuTech digital printer in the early 1990s, and with such unfortunate trends as a steady decline in the sales of books, the industry responded with a wide range of short-run and on-demand printing solutions, even if that meant a quantity of one.

In better days, high-volume production shops churned books out by the thousands, and they still do when it comes to high profile, high volume runs. But, with the Book Industry Study Group reporting 23 million fewer books sold in 2003 than in 2002, companies like GP<sup>2</sup> Technologies Inc., Bow, NH, have stepped up with their new semi-automatic Autocase SC-2 hardcover book binding machines designed to cost-effectively accommodate runs of one to 1000 — and do so with no slack in quality. While short run solutions have existed for sometime for producing soft cover books, Thomas Porat, president and founder of GP<sup>2</sup>, saw that the niche for short run, hardcover cases was a critical area not being filled.

"Early on," recalls Porat, "we were in touch with the library bindery industry, where most of the work was done by hand. These binderies would get a box of books from a library and they were told to remake these books, with every one of them being a different size. We needed a machine to satisfy the quality requirements of the library binders, and be the ultimate short run solution...Quantity of one. We also knew it couldn't be solved with a traditional mechanical machine. It needed to be a servo motion, computer driven solution."

To achieve the required flexibility and high precision for the binding machine, Porat specified the D M C - 2 1 8 3

Ethernet controller from Galil Motion Control Inc., Rocklin, CA. "I was looking around for a



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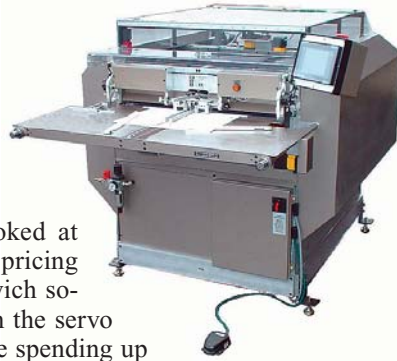
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multi-axis solution,” says Porat. “We looked at other alternatives, but kept running into a pricing problem. We then went with Galil’s sandwich solution, which combines the controller with the servo drive without any cabling. Before, we were spending up to 15% of the total system cost on cabling alone, which was ridiculous. Not only did the Galil controller eliminate this problem, it made the system less expensive and more reliable in a smaller, cleaner package.”

Along with high-speed Ethernet connectivity, the card-level DMC-2183 controller delivers eight axes of coordinated motion in a 4.25- x 10.75-in. form factor to guide the servomotors during various aspects of production within the machine. Three of the axes manipulate the system back and forth, up and down, and in rotation. Gearing is also used to synchronize other processes with the motion. The remaining five axes are used to transport, fold, brush and clamp the cover. A high-speed latch feature synchronizes inputs with position for precise registration.

During the hardcover casemaking process, the Autocase SC-2 automatically registers and measures the front and rear panels of the case or cover boards to the cover material, using sizing arms. To accomplish this, the dual encoder function of the DMC-2183 reads the rotation of the sizing arms to establish X-Y measurements of the actual book cover. The cover material is then pressed, smoothed and folded precisely over the edges of the panels, resulting in a high quality, completed cover that looks as good as any hardcover book sold in bookstores. While alternative, manually operated short run systems are available, the human factor tends to result in errors and less than satisfactory construction, including loose folds or wrinkles.

Another feature of the machine is its ability to handle quick changeovers. “With high volume machines, someone would spend anywhere from a half an hour to two hours to change from one size to another,” adds Porat. “If you’re doing runs of five or ten thousand, then it’s insignificant. But if you’re doing runs of 20 or 50, then it’s unacceptable.”

In addition, since the DMC-2183 handles all the complex motion coordination tasks, the Autocase system is very easy to use. An operator uses a simple touchscreen interface instead of pushbuttons to make adjustments. The operator can monitor the quality of the process, as the measured book size is displayed on a screen to show the finished result. Changing from one to another size book requires zero make-ready time.



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Operator safety is also addressed by moving from a hand operation to the Autocase SC-2. Porat explains that with mechanical systems, "...operators would have to use their hands to coordinate the gauge blocks for registering the spine and the two boards. They would do the folds by hand, using a clamping device and a foot pedal. There are a lot of safety issues with this process, in addition to carpal tunnel syndrome."

The automated system operates at speeds of up to 300 cycles per hour, and can produce case sizes as large as 16-in. high x 26-in. wide. The compact size and improved connectivity of the DMC-2183 has also enabled GP<sup>2</sup> to develop a generic eight-axis controller box that can be used for developing more custom machines, including their newest Autocase AC-20, a fully automatic casemaker, which uses 24 axes of motion, controlled by three eight-axis, Ethernet connected, Galil controllers.

Minimizing waste is another byproduct of shorter, on-demand print runs, according to Porat. For example, "In manufacturing books in high volume, there is an incredible amount of waste with unused or unsold books being returned and, then essentially getting recycled as pulp. Essentially, someone misjudges how many they should be printing." Additionally, Porat sees how publishers will be able to economically accommodate requests for small quantities of out-of-print publications. He also envisions increased customization and personalization of ring binders and book cover designs as a driving trend. "Imagine; every book cover can be personalized."

—SG

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### Upcoming Events: Design/Manufacturing/Automation

**IMTS – International Manufacturing Technology Show**  
Sept 8-15, McCormick Place, Chicago, IL  
[www.imts.com](http://www.imts.com)

**EME – Electrical Manufacturing Expo**  
Sept. 20-22, Indiana Convention Center, Indianapolis, IN  
[www.electricalmanufacturing.org](http://www.electricalmanufacturing.org)

**ATEXPO – Assembly Technology Expo**  
Sept. 28-30, Don Stephens Convention Center, Rosemont, IL  
[www.atexpo.com](http://www.atexpo.com)

**MD&M Minneapolis – Medical Design & Manufacturing**  
Oct. 19-21, Minneapolis Convention Center, Minneapolis, MN  
[www.devicelink.com/expo/minn04/welcome.html](http://www.devicelink.com/expo/minn04/welcome.html)

**RoboNexus**  
Oct. 21-23, Santa Clara Convention Center, Santa Clara, CA  
[www.robonex.com](http://www.robonex.com)

**ASME International Mechanical Engineering Congress and R&D**  
Nov. 13-19, Anaheim Hilton, Anaheim, CA  
[www.asmeconferences.org/Congress04/IndustryTracks.cfm](http://www.asmeconferences.org/Congress04/IndustryTracks.cfm)



# The Blend Justifies the Beans

## Automating coffee processing

Carlos deAldecoa's business strategy included an important automation gambit. If it succeeded, Cadeco Industries would field the largest full service bulk coffee processing plant in the United States and provide customers with unprecedented processing accuracy and quality control. That was late in 1999, when deAldecoa, Cadeco's president, decided to purchase a rice plant only a mile from the port of Houston, TX, and retrofit it into the nation's most automated bulk coffee processing facility. Today, deAldecoa's decision is paying off — Cadeco's new 200,000 ft<sup>2</sup> plant is fully automated, run by just a handful of technicians and laborers; a typical coffee processing plant of its size would require 30 workers. Its processing accuracy and quality assurance levels have exceeded expectations, customers are happy, and Cadeco is poised to reap market share.



Cadeco's facility

Cadeco sells coffee to major supermarket chains, specialty coffee companies and food conglomerates that use third party brokers to buy for major brands. Either Cadeco sells a specific blend to a customer, or the customer will send its own coffee and Cadeco will blend it according to customer specifications. "We work with all types of companies, from the major companies to the small regional roasters," deAldecoa said. The plant can process up to 750 million lbs of coffee per year. At least one competitor processes more volume, but according to deAldecoa, no US competitor provides the complete range of services that Cadeco does. Those services include cleaning, drying, blending, steaming, roasting, storing and shipping coffee beans harvested in Africa, Central America and South America.

After Cadeco bought the facility, deAldecoa had the old electrical and mechanical equipment stripped out, leaving only the silos. "We considered leaving some operations hand-operated but finally decided to automate fully," deAldecoa said. "Our investment was higher at that point but our operating cost is lower. Without automation, we'd need so many different operators that the cost would be prohibitive and the controls would be inaccurate and unreliable.

The plant receives coffee by truck or railcar — either in bags of 120 to 155 lbs, or in 20-foot containers holding up to 46,000 lbs each. For the latter, a hydraulic device tilts entire trucks to dump the containers into a receiving pit. The beans then